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**The Assam Royal Global University, Guwahati**  
**Royal School of Environmental and Earth Sciences**  
**M.Sc. Environmental Science, 4<sup>th</sup> Semester**  
**Semester End Examination, June 2023**  
**Course Title: Soil Science**  
**Course Code : ENV164C401**

**Time: 3 Hours**

**Maximum Marks: 70**

**Note: Attempt all questions as per instructions given.**  
*The figures in the right-hand margin indicate marks.*

**Section – A**

1. Attempt **all** questions. (Maximum word limit 50) **2 x 8**
- a. Classify soil based on texture.
  - b. What are the factors affecting soil fertility?
  - c. What are the major components of soil based on volume?
  - d. Which soil is having the highest phosphorus fixing capacity and why?
  - e. What is sodium adsorption ratio?
  - f. What is the order of adsorbed cations on clay particles?
  - g. Which type of soils retains maximum water and why?
  - h. Black cotton soil is found in which region and is associated with which rocks?

**Section – B**

2. Attempt **any one** of the following: **12 x 1**
- a. Briefly discuss various factors that control the formation of soil. Explain with suitable example.
  - b. Define humus and discuss the fractions of humus. What is the role of humus in soil quality?
3. Attempt **any two** of the following: **7 x 2**
- a. When an amount of water (in mm of water depth) of 200 mm is present in a depth of one meter of soil. Find the soil moisture content in percent of volume.
  - b. Discuss the significance of soil temperature and soil water on plant growth.
  - c. Explain how soil color is one of the important soil physical parameter?
4. Attempt **any two** of the following: **7 x 2**
- a. How cation exchange is an important parameter in determining soil quality?
  - b. What are saline soils? How to distinguish alkaline, saline-sodic and alkali soils? 2+5
  - c. What causes soil acidity? How it affects the plant growth? Classify soil based on pH levels. 2+3+2
5. Attempt **any two** of the following: **7 x 2**
- a. Define carbon to nitrogen ratio. Discuss how this parameter affects the soil quality of a particular region? 2+5
  - b. Critically analyze the impact of climate change on soil and land degradation.
  - c. Why earthworms are called a “Farmer’s Friend”? What are the different types of biogenic structures in soil? 4+3